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(54) Method of reinforcing a top layer of a ground, as well as reinforcing mat applied therefor.

(57) The invention relates to a method of reinforcing a top layer (7) of a ground, which top layer consists of bitumen, asphalt or a hydrocarbon containing material of like nature, by fixing at least one reinforcing mat (1) to the bearing surface or foundation (6) of the ground to be reinforced and by then applying a top layer of sufficient thickness to the foundation, so that the reinforcing mat is completely embedded in the top layer, whereby before applying the top layer ; longitudinal elements (5) are fitted that extend longitudinally of the reinforcing mat for fixing the reinforcing mat to the foundation and whereby these longitudinal elements are fixed to the foundation by means of fixing means.

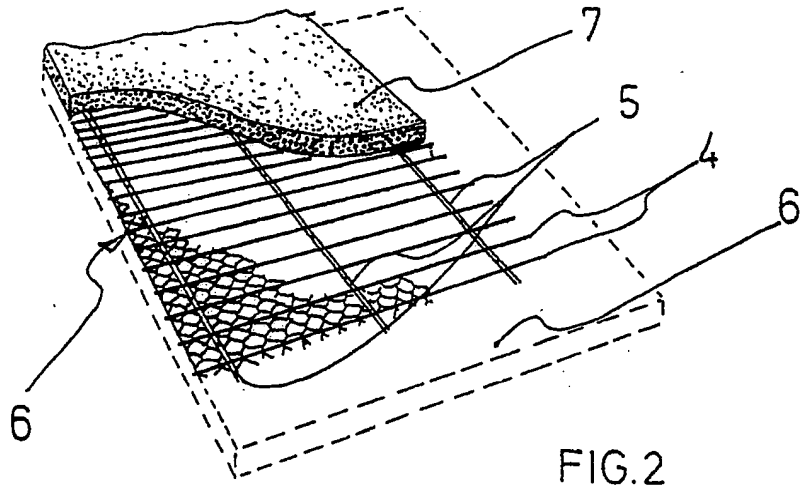

FIG.2

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METHOD OF REINFORCING A TOP LAYER OF A GROUND, AS WELL AS REINFORCING MAT APPLIED THEREFOR.

The invention relates to a method of reinforcing a top layer of a ground, which top layer consists of bitumen, asphalt or a hydrocarbon containing material of like nature, by fixing at least one reinforcing mat to the bearing surface or foundation of the ground to be reinforced and by then applying a top layer of sufficient thickness to the foundation, so that the reinforcing mat is completely embedded in the top layer.

Such a method of reinforcing a ground, roads in particular, is generally known.

A successfully applied reinforcing mat for carrying out such a method, is sold by N.V. BEKAERT S.A., the applicant, under the name of: "MESH TRACK". "MESH TRACK" is a galvanised steel wire woven mat or mesh, reinforced at equal intervals by a three-wire strand. The hexagonal meshes of this mat are obtained by intertwisting the wires, the three-wire strands being fitted at equal intervals in the torsions formed. Mats of synthetic material can be applied as well.

When reinforcing a top layer of a ground, a road for instance, which top layer consists of bitumen, asphalt or a hydrocarbon containing material of like nature, rolls of reinforcing mats are unrolled in longitudinal direction on the ground foundation and fixed thereto to keep the reinforcing mats in place during the application of the top layer. This ground foundation can for instance be an already existing road metalling or a foundation to be made.

A drawback of the method described hereinabove is the expensive and time-consuming process to fix such a reinforcing mat to the foundation. Such a steel wire woven reinforcing mat is fixed to the foundation by means of specially shaped clamps and/or hooks, which are clamped over the wires or the strands of the mat and fixed to the foundation by means of plugs and pins. Mats of synthetic material are mostly fixed by metalling; i.e., a broken-stone layer of sufficient thickness is laid over the mats.

A further drawback of the method described hereinabove is that during the subsequent application of the top layer of sufficient thickness of bitumen, asphalt or a hydrocarbon containing material of like nature by means of the special road-building machines, a large number of these hooks or clamps come loose because the reinforcing mat is constantly subjected to two opposite, longitudinal pressure forces, as a result of which this mat is subjected to an upward pressure.

It is the object of the invention to eliminate the aforesaid drawbacks.

To this end, the invention proposes with reference to a method of the type mentioned at the beginning, that, before the application of the top layer, longitudinal elements be fitted that extend longitudinally of the reinforcing mat for fixing the reinforcing mat to the foundation and that these longitudinal elements be fixed to the foundation by means of fixing means. Preferably, the longitudinal elements are woven in the reinforcing mat before they are fixed to the foundation.

In another preferred embodiment of the method in accordance with the invention, the longitudinal elements are put under stress as they are fixed to the foundation.

The invention also relates to a reinforcing mat for the application of the methods in accordance with the invention. The reinforcing mat in accordance with the invention is characterised in that this reinforcing mat is fitted with longitudinal elements in longitudinal direction thereof.

Preferably, the reinforcing mat in accordance with the invention is a braided mat and the longitudinal elements are woven in the mat. This reinforcing mat can then be made of steel wire and in the torsions thereof it can be fitted with transversely extending reinforcing elements.

In a preferred embodiment of the reinforcing mat in accordance with the invention, the transversely extending reinforcing elements and the longitudinal elements intersect nearly at right angles. Preferably, the longitudinal elements are fitted under the transversely extending reinforcing elements.

The transversely extending reinforcing elements and the longitudinal elements can be strands or wires of steel wire. Preferably, the longitudinal elements are made of strip steel. It is also possible, however, that the longitudinal elements are strips of synthetic material.

The invention will be explained more fully in the following description with reference to the accompanying drawing, in which:

figure 1 shows part of a preferred embodiment of a reinforcing mat in accordance with the invention, and

figure 2 shows, in perspective, part of a ground, representing a part of the top layer, reinforcing mat and foundation.

The preferred embodiment of the reinforcing mat 1 in accordance with the invention represented in figure 1 consists of a woven or braided mat with hexagonal meshes. The hexagonal meshes are obtained by intertwisting the longitudinal wires 2 and 3, transversely extending reinforcing elements 4 in the form of strands being fitted at equal intervals in

the torsions. Preferably, the longitudinal wires 2 and 3 and the strands 4 are made of steel wire, which steel wire is preferably galvanised. The longitudinal wires 2 and 3 can have a nominal diameter of 3 mm, for instance; whereas the wires of the 3-wire strands 4 have a nominal diameter of 3,55 mm. Preferably, the meshes have the following dimensions: 118 mm between the torsions in longitudinal direction and 80 mm between the torsions in transverse direction. The strands 4 are fitted at a distance of 236 mm from each other. All the dimensions given hereinabove are only given by way of example.

In the case of the reinforcing mat 1 in accordance with the invention, longitudinal elements 5 are woven in the mat in longitudinal direction. These longitudinal elements 5 can also be steel wires or strands of steel wire; preferably, however, these longitudinal elements 5 are made of strip steel. Preferably, this strip steel is galvanised and can have the following dimensions: a 10 mm to 30 mm width and a thickness of 0.4 mm to 1.5 mm. Here as well, the dimensions given are only given by way of example. Preferably, all the longitudinal elements 5 are fitted under all the transversely extending strands 4 and the longitudinal elements 5 and the wire strands 4 intersect nearly at right angles.

The reinforcing mats 1 in accordance with the invention can be made of synthetic material or of steel wires coated with synthetic material. The longitudinal elements 5 can be strips of synthetic material.

The method in accordance with the invention is described with reference to figure 2. On the bearing furnace or foundation 6, onto which a top layer 7 of a ground, for instance a road, is to be applied, a reinforcing mat 1 in accordance with the invention is unrolled first and the longitudinal elements 5 are fixed to the foundation 6 by means of fixing means, such as plugs and/or pins. This foundation 6 can for instance be an old existing road. Then, the top layer 7 of bitumen, asphalt or a hydrocarbon containing material of like nature is applied to the foundation 6 and the reinforcing mat 1 fixed by means of the longitudinal elements 5, so that the reinforcing mat is completely embedded in the top layer 7.

Preferably, the longitudinal elements 5 are put under tensile stress as they are fixed to the foundation 6. This can be done in different ways. The longitudinal elements 5 can be put under stress over the whole length and then fixed to the foundation 6. The longitudinal elements 5 can be fixed to the foundation 6 first, after which the longitudinal elements are put under stress.

It has now been found that a reinforcing mat 1 in accordance with the invention can be fixed to the foundation 6 with much less fixing means and that the effectiveness of fixing the reinforcing mat 1 by means of the longitudinal elements 5 is improved considerably. This is particularly so, if the longitudinal elements 5 are made of strip steel and are located under the transverse strands 4.

It is clear that numerous variants of reinforcing mats can be applied within the scope of the invention. It is even possible, for instance, to use a reinforcing mat 1, which solely consists of longitudinal elements 5, which are connected to each other by transverse elements 4. Preferably, the transverse elements 4 are then two wires spiral led or twisted around each other, between which the longitudinal elements 5 are fitted.

Claims

1. Method of reinforcing a top layer of a ground, which top layer consists of bitumen, asphalt or a hydrocarbon containing material of like nature, by fixing at least one reinforcing mat to the bearing surface or foundation of the ground to be reinforced and by then applying a top layer of sufficient thickness to the foundation, so that the reinforcing mat is completely embedded in the top layer, characterised in that, before the top layer (7) is applied, longitudinal elements (5) are fitted that extend longitudinally of the reinforcing mat (1) for fixing the reinforcing mat (1) to the foundation (6) and in that these longitudinal elements (5) are fixed to the foundation (6) by means of fixing means.

2. Method in accordance with claim 1, characterised in that the longitudinal elements (5) are fitted in the reinforcing mat (1) before they are fixed to the foundation (6).

3. Method in accordance with claim 1 or claim 2, characterised in that the longitudinal elements (5) are put under tensile stress as they are fixed to the foundation (6).

4. Reinforcing mat for the application of the method in accordance with one or more of the preceding claims 1-3, characterised in that the reinforcing mat (1) is fitted with longitudinal elements (5) in longitudinal direction thereof.

5. Reinforcing mat in accordance with claim 4, characterised in that the reinforcing mat (1) is a braided mat.

6. Reinforcing mat in accordance with claim 5, characterised in that the longitudinal elements (5) are woven in the reinforcing mat (1).

7. Reinforcing mat in accordance with one or more of the preceding claims 4-6, characterised in that the reinforcing mat (1) is made of steel wire.

8. Reinforcing mat in accordance with one or more of the preceding claims 4-7, characterised in that the reinforcing mat (1) is fitted with transversely

extending reinforcing elements (4).

9. Reinforcing mat in accordance with claim 8, characterised in that the transversely extending reinforcing elements (4) and the longitudinal elements (5) intersect nearly at right angles.

10. Reinforcing mat in accordance with claim 8 or claim 9, characterised in that the longitudinal elements (5) are fitted under the transversely extending reinforcing elements (4).

11. Reinforcing mat in accordance with one or more of the preceding claims 8-10, characterised in that the transversely extending reinforcing elements (4) are strands of steel wire.

12. Reinforcing mat in accordance with one or more of the preceding claims 4-11, characterised in that the longitudinal elements (5) are wires or strands of steel wire.

13. Reinforcing mat in accordance with one or more of the preceding claims 4-11, characterised in that the longitudinal elements (5) are made of strip steel.

14. Reinforcing mat in accordance with one or more of the preceding claims 4-11, characterised in that the longitudinal elements (5) are strips of synthetic material.

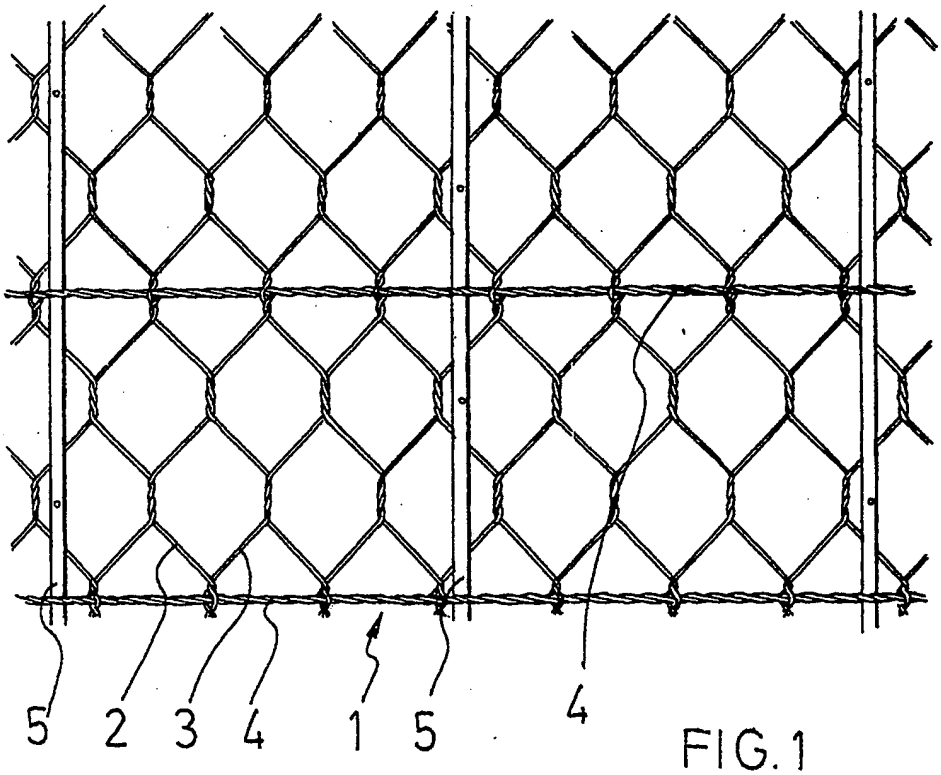

FIG.1

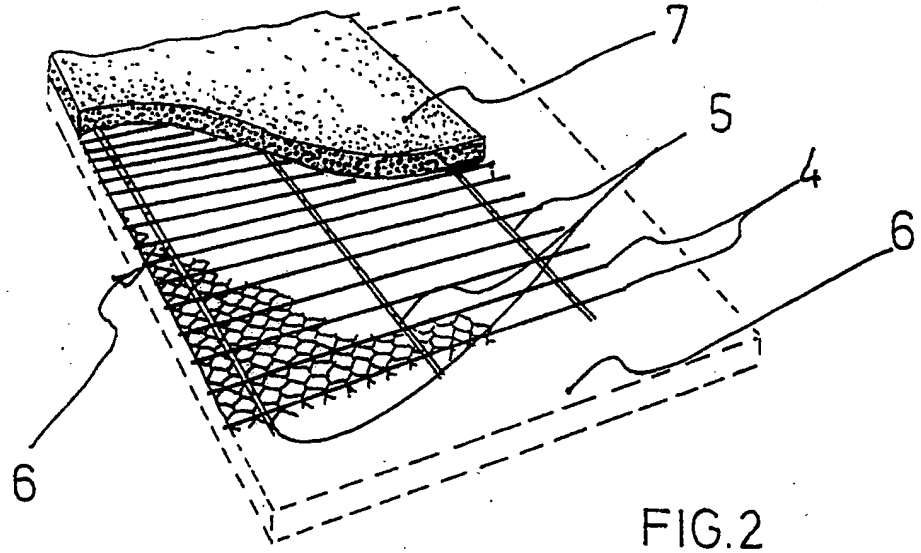

FIG.2

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EUROPEAN SEARCH REPORT

Application Number

EP 90 20 2765

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
Y	WEGEN vol. 62, no. 2, February 1988, Boskoop NL; pages 31 - 35; Ing. A.L.J. Schoffelen: "Toepassing asfaltwapening in proefvakken" * page 32, right-hand column, paragraph 2 - page 33, left-hand column, paragraph 1 *	1-9,11,13	E 01 C 11/16
Y	US-A-2 338 785 (SOMMERFELD) * page 1, right-hand column, line 8 - page 2, left-hand column, line 10; figures 1-5 *	1-9,11,13	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

E 01 C

The present search report has been drawn up for all claims

Place of search	Date of completion of search	Examiner
The Hague	25 February 91	DE COENE P.J.S.

CATEGORY OF CITED DOCUMENTS

X: particularly relevant if taken alone
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